

Patent Application of
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SPECIFICATION

TITLE OF INVENTION

Leak Proof Toilet Tank Siphon Flush Valve

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of prior application number 10/259,674, filed September 30, 2002, which claims the benefit of U.S. Provisional Application number 60/327,946, filed October 10, 2001, and U.S. Provisional Application number 60/348,246, filed January 15, 2002.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

REFERENCE TO A MICROFICHE APPENDIX

Not Applicable

BACKGROUND OF THE INVENTION

A typical toilet tank like that found in most homes has a flush valve located within the toilet tank. A flapper resting on top of the flush valve stops the flow of water through the flush valve and forms a somewhat watertight seal. When the toilet flush handle is pushed downwards, the flapper is lifted allowing water to flow through the flush valve, flushing the toilet. The method of sealing the flush valve with a flapper is common. At some point, the underside of the flapper and the top portion of the flush valve that are in contact and forms a somewhat watertight seal

degenerates and begins to leak. Leaking begets leaking and after some time a considerable amount of water is being wasted and the flush valve and flapper must be replaced.

BRIEF SUMMARY OF THE INVENTION

The object of the present invention is to provide a leak proof flush valve that will retrofit existing toilet tanks as well as be able to be installed in new toilet tanks and having a life expectancy of many years and a cost that is less than conventional flush valves. The Leak Proof Toilet Tank Siphon Flush Valve comprises a toilet tank flush valve having a cross section of a portion of its entrance normally resting in a position above the waterline so water can never leak entirely through the entrance. Only when the toilet is being flushed does the entire entrance momentarily fall below the waterline creating a siphon allowing the water to be siphoned out of the tank, flushing the toilet. When most of the water has been siphoned out of the tank, the siphon is broken and a float raises as the fill valve refills the tank again keeping a cross section of the entrance above the water line.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

Figure 1 is perspective view of the toilet tank outlet fixture.

Figure 2 is perspective view of the flexible tubing.

Figure 3 is a perspective view of a flush valve seal.

Figure 4 is a perspective view of a partial assembly.

Figure 5 is a plan view of the float.

Figure 6 is a perspective view of the entire assembly in a rest position.

Figure 7 is a perspective view of the entire assembly during a flush cycle.

DETAILED DESCRIPTION OF THE INVENTION

The following discloses a means of flushing a toilet by creating a siphon within flexible tubing so that when the toilet is not being used while the toilet tank is full of water, at least one entire cross section of the flexible tubing is entirely above the water surface so that the toilet tank will never leak water while not being used.

Fig. 1 shows a tank outlet fixture 1 having a lip 3 and a threaded end 5. Fig. 2 shows a partial view of flexible tubing 7. The flexible tubing 7 may have an internal support structure or may be made with ribs or baffles to help maintain the shape of its cross section. Fig. 3 shows a typical flush valve seal 11 having tapered side walls as shown. Fig. 4 shows the assembly of the tank outlet fixture 1, the flexible tubing 7, and the seal 11 to a toilet tank 13 of which only a partial representation of the tank 13 is shown. The flexible tubing 7 is fitted over the tank outlet fixture 1 with the threaded end 5 of the tank outlet fixture 1 protruding through the flexible tubing outlet end 9 as shown. The seal 11 is fitted over the flexible tubing 7 and outlet fixture 1 so that the tapered end of the seal 11 is positioned above the tank outlet hole 10 as shown and the top of seal 11 is positioned below the lip 3 of the outlet fixture 1. The threaded end 5 of the outlet fixture 1 extends through the tank outlet hole 10. The flexible tubing outlet end 9 also extends through the tank outlet hole 10 as shown. When the fastening element 15 is fastened onto the threaded end 5 of the outlet fixture 1, the seal 11 forms a watertight seal between the flexible tubing 7 and the tank 13. Fig. 5 shows a plan view of a float 41 having two holes 43 that extend through the float 41 that are positioned as shown. The float may be made from styrofoam but is not limited to styrofoam. Any suitable buoyant material may be used.

Referring now to Figs. 6 and 7. One end of the flexible tubing 7 is fastened and sealed to the tank 13 as previously described and the flexible tubing 7 is fitted into the tank 13 in an upside down U-shaped configuration as shown. This U- shaped configuration is maintained by having the flexible tubing 7 inserted into both holes 43 located in float 41 as shown. In Fig. 6 at least one entire cross section of the flexible tubing 7 that lies in a plane which is at right angles to the walls of the flexible tubing 7 and also at right angles to the surface of the water is entirely above the water surface 37 as shown. One end of the toilet fill tube 29 extends from the toilet fill valve outlet 27 with its other end fed into the flexible tubing inlet end 35 as shown. The float 41 is applying an upwards pressure on the fill valve lever 19 keeping it in an off position so that water is neither entering the tank 13 or the toilet via fill tube 29. When flush handle 23 is pushed upwards the flexible tubing 7 is forced downwards, via extension 25 pushing downwards on float 41, so the flexible tubing 7 is substantially submersed beneath the water surface 37 so the inside of the flexible tubing 7 is substantially under and filled with water. The water begins to siphon and drain out of tank 13 through the outlet fixture 1, shown in Fig. 1 and Fig. 4, lowering the water level 37. As the water level 37 in tank 13 drops below the upper most portion of flexible tubing 7, the inside of flexible tubing 7 remains substantially filled with water because of the siphon created when the flexible tubing 7 is substantially submersed beneath the water surface 37 so the water continues to drain out of the tank 13 as previously described until the water surface 37 falls beneath the flexible tubing inlet end 35 breaking the siphon and stopping the draining of water from tank 13.

As the water level 37 falls, the fill valve lever 19 falls which opens up fill valve 17 allowing water to enter the toilet via toilet fill tube 29 and allows water to begin filling the tank 13 via tank fill outlets 31. The tank 13 water level rises pushing upwards on float 41 until the fill valve lever

19 is forced upwards by float 41 far enough and fill valve lever 19 closes, stopping the flow of water into the toilet and tank 13 so that the water level 37 is once again at the position shown in Fig. 6. This completes one flush cycle.

A float 41 positioned beneath the bottom of the bend in the flexible tubing 7 shown in Figs. 6 and 7 is used to keep at least one entire cross section of the flexible tubing 7 as previously described entirely above the water surface 37 while the toilet is not being flushed.

It is an important part of this invention that the distance the bottom of the flexible tubing end 35 is from the bottom of the tank 13 at the time the siphon is broken and water stops draining from tank 13, substantially defines the amount of water used during one flush cycle. It is also an important note that fill tube 29, used to fill the toilet bowl, is not necessarily needed with this type of flush valve. After the siphon begins to break and the toilet completes its flush, there is enough water still being siphoned after completion of the flush and before the siphon to completely broken to fill the toilet with enough water for the next flush. Prior to this invention, water entering the toilet via toilet fill tube 29 was the source used for this purpose. In other words, the toilet fill tube 29 and the internal components of the fill valve 17 supporting this portion of the toilet fill valve outlet 27 can be removed from the fill valve 17, significantly reducing the costs of the fill valve 17.